
UNITED STATES CIVIL DEFENSE

Light Duty Rescue Course



IG-14-2 (Instructor's Guide)

20040308 352

DISTRIBUTION STATEMENT A
Approved for Public Release
Distribution Unlimited

FEDERAL CIVIL DEFENSE ADMINISTRATION

United States Government Printing Office : July 1956

For sale by the Superintendent of Documents, U. S. Government Printing Office
Washington 25, D. C. - Price 35 cents

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INTRODUCTION

This guide will be of assistance to all instructors, particularly those who have had no teaching experience; however, instructors should have thorough training in the subject.

The course Light Duty Rescue is eligible for matching funds, provided instructors have:

1. Satisfactorily completed a light duty rescue course and the 10-hour Civil Defense Instructor's Course No. 3.3, or its equivalent; or
2. Satisfactorily completed the Light Duty Rescue Instructor Training Course as taught at the Federal Civil Defense Administration Rescue Instructor Training School, Olney, Md.; or
3. Satisfactorily completed the Heavy Duty Rescue Instructor Training Course as taught at the FCDA Rescue Instructor Training School, Olney, Md.

This guide in light duty rescue includes:

SUGGESTIONS TO INSTRUCTOR

COURSE OUTLINE

LESSON AIDS

LESSON PLANS

SUGGESTIONS TO INSTRUCTOR discusses the use of a check sheet, training equipment, and facilities.

The COURSE OUTLINE gives by subject, pertinent information such as: length of time, recommended size of class, and prerequisites.

LESSON AIDS present course material that may be developed and used by the instructor.

LESSON PLANS blueprint the lessons, indicating to the instructor the subjects to be covered and the order to be followed. They list the training materials and references.

SUGGESTIONS TO INSTRUCTOR

Instructor Qualifications

The Instructor Training Course No. 3.3 stresses the importance of the following steps in instruction:

1. Introduction.
2. Presentation.
3. Supervision of practice.
4. Testing and followup.

Check sheets are helpful in testing and followup. Following is an example:

Check sheet for climbing ladders

	Position of hands	Position of feet	Position of body	Position of eyes
Jones-----	O. K.	?	O. K.	O. K.
Smith-----	?	O. K.	?	?
Doe-----	O. K.	?	O. K.	O. K.
Adams-----	O. K.	O. K.	?	?
Kelly-----	O. K.	?	O. K.	O. K.

Use of this chart checks the instructor as well as the learner. When several learners make the same mistake, the instructor should question his method of instruction. He should review occasionally Course No. 3.3 as it contains principles of good teaching. Because the instructor is dealing with volunteers, he should make every effort to create favorable response and to hold their interest throughout the course.

To teach this course the instructor should have complete lesson plans and reference materials. The training program must be as varied as possible and should include all classes of rescue problems. The instructor should make the training exercises realistic to give the members practice in situations similar to an actual operation.

In his discussion of the stages of rescue, the instructor should show the filmstrip "Reconnaissance and Rescue by Stages" either as an introduction to that phase or as a summary.

Equipment for Training

The approved FCDA light duty rescue truck with standard and supplemental rescue tools and equipment is an optimum choice for training rescue teams as highly mobile, self-contained units capable of operating with a minimum of dependency upon outside aid. Items included in the complete lists have been selected on the basis of mass rescue experience. They are set forth in detail in Lesson Plan No. 2, entitled "Care and Use of Truck, Tools, and Equipment."

Facilities

The facility XI-19 listed in the Federal Contributions Manual M25-1 (revised), or its equivalent, should be available. It is impossible to give training in this course without proper facilities. Instructors should interest city officials in the training program. City officials know of buildings being dismantled or torn down and may be able to make them available for the course.

COURSE OUTLINE

TITLE: Light Duty Rescue—Course No. 14.2

TIME: 16 hours

Recommended Number Of Trainees: 26

Recommended For: Able-bodied civil defense volunteers of all services. It is a prerequisite for Heavy Duty Rescue Course No. 14.3.

Prerequisites: Basic Rescue Course No. 14.1

NO.	LESSONS	HOURS
1.	Rescue in survival planning-----	4
2.	Care and use of truck, tools, and equipment-----	1
3.	Care and use of ladders (part II)-----	1
4.	Rescue from limited heights-----	2
5.	Shoring and bracing (part I)-----	2
6.	Rescue from basements-----	2
7.	Emergency control of damaged utilities-----	1
8.	Casualty simulation-----	1
9.	Rescue exercise-----	2

LESSON AIDS

1—Rescue in Survival Planning

For speedy, safe, and efficient operations rescue squads should have:

1. Efficient organization.
2. Adequate equipment.
3. Proper techniques in performing the work.

The purpose of this lesson is to teach rescue workers how to work in squads and teams, using approved skills and techniques. Emphasis must be placed on training these men to be leaders because every trained team member may eventually be a team leader with responsibility for training his team. The role of team leader must be alternated so everyone will have an opportunity to be leader.

Rescue work usually is conducted under difficult and confused conditions. It is important that rescue operations be carried out systematically in stages and that a definite plan be followed.

On first approach to a large rescue operation, even the best leaders tend to overestimate the difficulties because of the confusion and apparent magnitude of the job. This reaction is quite natural. At such times a leader should exercise all his qualities of coolness, perseverance, and courage. He must make full use of the knowledge gained in his training and previous experience.

At the same time, the rescue team members must show confidence in the leader and help him. This help can be more effective if they:

1. Ask only necessary questions.
2. Make suggestions when asked.
3. Are attentive and receptive to instructions.
4. Keep together on the job.
5. Concentrate on the job at hand.

A set of rules covering every rescue situation cannot be established. However, by proceeding in stages according to a regular pattern, rescue leaders will be less likely to overlook important points and better able to organize appropriate action.

LESSON PLAN NO. 1

COURSE: Light Duty Rescue—Course No. 14.2

LESSON TITLE: Rescue in Survival Planning

TIME: 4 hours

TRAINING MATERIALS:

- Blackboard, chalk, eraser.
- Film projector and screen.
- Film: "Work of the Rescue Unit".
- Filmstrip projector and screen.
- Filmstrip: "Reconnaissance and Rescue by Stages".

REFERENCES:

- Rescue Techniques and Operations*, FCDA, TM-14-1.
- Introduction To Radioactive Fallout*, FCDA, IG-19-1.

MOTIVATION:

The primary mission of the rescue service is the rescue of trapped persons. With the new concept of rescue as discussed in this lesson plan, members of rescue squads have responsibilities not previously delegated to them. Rescue service operations are integrated with other civil defense services. Rescuers must understand the factors involved in figuring rescue requirements.

While specific rules to fit each rescue problem cannot be established, general rules that apply to any rescue operation can. The squad leader must approach a rescue operation logically. He must plan his work systematically. If he plans his rescue by stages, he will be less likely to overlook important points, and the location of casualties will be more accurately determined.

MAIN TOPICS	TEACHING POINTS
A. BASIC DEFENSE TECHNIQUES	<p>The development of thermonuclear weapons, with vastly increased destructive power over that of the atom bomb, has necessitated basic changes in civil defense planning and operations.</p> <ol style="list-style-type: none">1. Evacuation. Evacuation of our target areas, and shelter adequate to protect occupants from blast, heat, and radiation are basic civil defense counter-measures against the effects of thermonuclear weapons.2. Shelter and cover.<ol style="list-style-type: none">a. Shelter is a protection against all effects of an H-bomb explosion: blast, heat, initial radiation, and residual radiation.b. Shelter offers a good chance of survival beyond the zone of complete destruction.c. Cover is anything which offers protection from fallout, beyond the range of the first three effects of an H-bomb explosion.
B. RADIOLOGICAL CONCEPTS	<ol style="list-style-type: none">1. Problems. In areas of fallout, radiation intensities may be so high that rescue activities will have to be postponed or conducted with great caution. Decisions on protective cover, spot training, equipping, and assignments to operational areas will be made in accordance with the radiological situation. While the primary responsibility of the rescue service is to release the trapped,

MAIN TOPICS	TEACHING POINTS
B. RADIOLOGICAL CONCEPTS—Continued	<p>rescue squads may be assigned collateral duties, such as monitoring, if the radiological situation is serious.</p> <p>2. Training.</p> <p>FCDA offers three training courses at its Radiological Defense School at National Headquarters. These courses are for meter operators, radiological monitors, and radiological defense officers. Light Duty, Heavy Duty, and Advanced Rescue Instructor Courses at the FCDA Rescue Instructor Training School, Olney, Md., also include instruction in radiological instrumentation.</p>
C. EVACUATION AND RESCUE	<p>1. Mobilization.</p> <p>a. Light duty trained rescue personnel, on receipt of evacuation signal, will:</p> <ol style="list-style-type: none"> (1) If practicable, mobilize at predetermined neighborhood hospitals and institutions where they will assist in evacuation of non-ambulatory persons, or (2) Go directly to rendezvous area by whatever transportation is available. <p>b. Heavy duty trained rescue personnel, on receipt of evacuation signal, will:</p> <ol style="list-style-type: none"> (1) If practicable, mobilize at predetermined neighborhood sources of tools and equipment suitable for rescue operations, such as hardware stores and garages. They will aid in loading this equipment into available vehicles, or (2) Go directly to rendezvous area by whatever transportation is available. <p>2. Outward movement.</p> <p>Until the area is ordered cleared or the take cover signal is sounded, rescue personnel should continue to assist in evacuating people and loading equipment on vehicles.</p> <p>3. Rendezvous and expansion.</p> <p>a. Rendezvous areas will be predetermined by local civil defense organizations. Factors affecting the choice of location are:</p> <ol style="list-style-type: none"> (1) Proximity to evacuation routes. (2) Proximity to assembly areas which are sources of supplementary rescue manpower. (3) Proximity to rescue equipment already stockpiled or being assembled as evacuation progresses. (4) Priority of movement required for reentry into the attacked area. (5) Adequacy of space for forming the expanded rescue organization. <p>b. Expansion of rescue forces will begin immediately at the rendezvous areas.</p> <ol style="list-style-type: none"> (1) Light duty rescue squads will be expanded by the recruitment of 3 untrained to 1 trained light duty rescuer. (2) Heavy duty rescue squads will be expanded by recruitment of 3 skilled persons in allied fields to 1 trained heavy duty rescuer. <p>c. Spot training in both light duty and heavy duty rescue will begin immediately at rendezvous areas under leadership of trained rescuers.</p> <p>d. Vehicles include any available, such as passenger, commercial, and FCDA-recommended rescue trucks and trailers.</p>

Action of Trained Rescue Personnel on EVACUATION SIGNAL

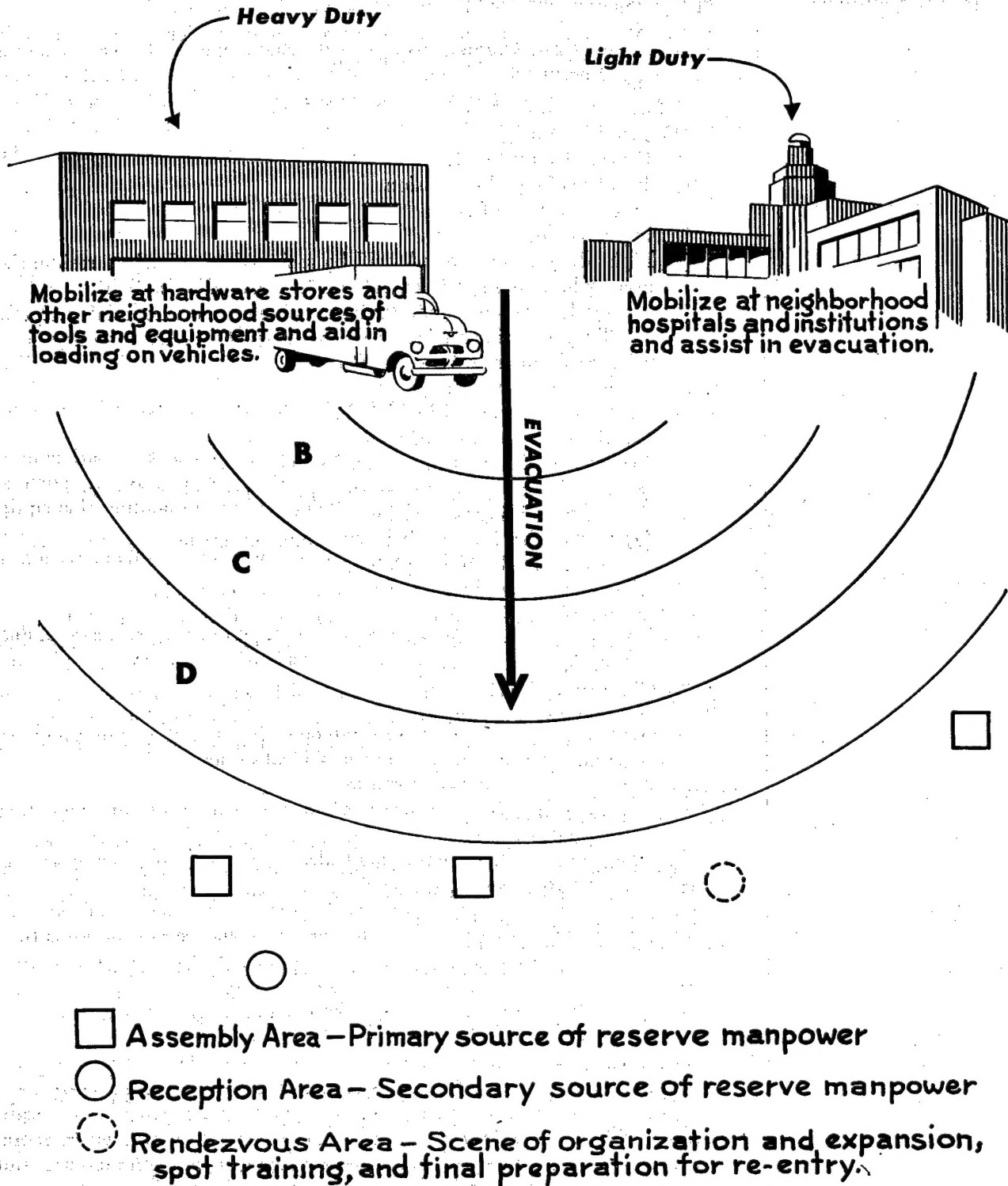


FIGURE 1.—Flow chart showing action of trained rescue personnel on evacuation signal.

MAIN TOPICS	TEACHING POINTS
D. TACTICAL RESCUE OPERATIONS	<p>1. Mission. The primary mission of the rescue service is to remove persons trapped in the wreckage of damaged structures, in or under vehicles, and in shelters where exits have been blocked.</p> <p>2. Functions.</p> <p>a. Before rescue operations:</p> <ol style="list-style-type: none"> (1) Mobilization. (2) Outward movement. (3) Rendezvous and expansion. (See main topic C.) <p>b. During rescue operations:</p> <ol style="list-style-type: none"> (1) Light duty rescue squads will be assigned to suburban residential areas where damage to structures is expected to be light. (2) Heavy duty rescue squads will be assigned to commercial, multiple dwelling, and industrial areas with steel frame, masonry, and reinforced concrete type structures. <p>c. Following rescue operations:</p> <ol style="list-style-type: none"> (1) The rescue service will assist the engineering services in <ol style="list-style-type: none"> (a) General clearance of rubble. (b) Reestablishment of essential services. (c) Provision of safe access to supplies critical to the survival of the remaining population. (d) Supplying information on damaged structures from which rescue has been completed. (2) The rescue service will assist the warden service in <ol style="list-style-type: none"> (a) Supplying information to wardens on damaged structures. (b) Helping evacuees to relocate in neighborhood dwellings declared safe for occupants. (3) The rescue service will aid the health services in returning non-ambulatory persons to their homes, hospitals, and institutions. (4) Rescue workers trained in radiological monitoring will assist in checking radiation intensities. <p>3. Organization.</p> <p>a. At main control center. The chief of rescue is at the main control center. He is responsible for evaluating the overall rescue problem and allocating rescue forces. He has a small staff responsible for requirements analysis, resources inventory, maps, and messages.</p> <p>b. At zone control centers. A zone coordinator of rescue is at each zone control center. He directs the deployment of forces in his jurisdiction as ordered by the chief of rescue, and keeps the chief advised on rescue needs and progress in his zone.</p> <p>c. At rendezvous areas. A rescue officer is at each rendezvous area. He sets up facilities for receiving, expanding, spot training, and equipping rescue forces; dispatches squads and teams in accordance with orders from the main control center; and keeps records of incoming and outgoing squads, equipment, and vehicles.</p>

MAIN TOPICS	TEACHING POINTS
<p>D. TACTICAL RESCUE OPERATIONS—Con.</p>	<p>d. At squad headquarters. Each light duty squad has a leader, a deputy, and 6 teams, each composed of 4 men, 1 of whom is designated team leader. In the absence of both the squad leader and deputy, the first team leader on the scene takes charge of all teams.</p> <p>4. Operational factors.</p> <ol style="list-style-type: none"> The effects of evacuation and shelter on the problem of rescue cannot be determined in advance. Command decisions on the deployment of personnel and equipment will be affected by the following: <ol style="list-style-type: none"> Approximate number of persons to be rescued and extent of operations required. Distances to scenes of operations—whether rescue forces can reach trapped persons in time. Type of access problem—whether heavy or light rescue is required. Danger of radiation exposure—whether intensities are low enough for rescue operations. <p>5. Communications.</p> <ol style="list-style-type: none"> The chief of rescue is responsible for establishing communications between the main control center and zone control centers, and with the field forces of the rescue service. He should also plan for zone or squad assumption of strategy and tactics if the communications chain of command fails. Message routines are as follows: <ol style="list-style-type: none"> If main control is functioning: <ol style="list-style-type: none"> Main control—zone control—squad. Main control—rendezvous. Squad—zone control—main control. Rendezvous—main control. If main control is not functioning: <ol style="list-style-type: none"> Zone control—squad. Zone control—rendezvous. Squad—zone control. Rendezvous—zone control. <p>6. Rescue squads required.</p> <ol style="list-style-type: none"> In lieu of more exact information from an urban analysis, a quick and relatively accurate estimate of the number of rescue squads required can be made after attack in the following manner: First, determine the number of rescues required, then break this total down into light and heavy duty rescues. With this information the number and type of rescue squads required can be determined. To determine the number of rescues needed, the following formula should be used: $Pr \times Pt \times Za = R$ Pr is the percentage of population remaining in a zone of damage after evacuation, Pt is the percentage of those people trapped, Za is the percentage of the zone which is accessible, and R is the percentage of normal population of the zone which must be rescued.

MAIN TOPICS	TEACHING POINTS
D. TACTICAL RESCUE OPERATIONS—Con.	<p>The percentages used for the factors of the formula (Pr, Pt, and Za) are estimates, based on knowledge of the city, size of bomb, extent of damage, and reports of civil defense personnel who are in the city after the bomb drop.</p> <p>The percentage resulting (R) when the formula is used can be converted into number of rescues by multiplying by the normal population in the zone (first column, fig. 2). The resulting figures can be broken down into the number of light and heavy duty rescues by multiplying them by the estimated percentages of light and heavy duty rescues required.</p> <p>To simplify use of the formula the table in figure 2 may be used.</p>

Zones of damage	Factors			R	Number of rescues
	Pr	Pt	Za		
A (Normal population, _____)					
B (Normal population, _____)					
C (Normal population, _____)					
D (Normal population, _____)					
				TOTAL	-----

FIGURE 2.—Table for using formula.

MAIN TOPICS	TEACHING POINTS
D. TACTICAL RESCUE OPERATIONS—Con.	To illustrate use of the formula, figure 3 shows a hypothetical case, Metropolis City.

Normal (census) population: 500,000. Population remaining after evacuation: 250,000					
Zones of damage	Factors				Number of rescues
	Pr	Pt	Za	R	
A (Normal population, 50,000)-----	10%	100%	0%	0%	None
B (Normal population, 100,000)-----	20%	90%	20%	3.6%	3,600
C (Normal population, 150,000)-----	30%	70%	70%	14.7%	22,050
D (Normal population, 200,000)-----	40%	30%	100%	12%	24,000
				Total-----	49,650

FIGURE 3.—Table showing use of formula for hypothetical city.

Breakdown of the total number of rescues (49,650) into the numbers for light and heavy duty, based on estimates of the percentage of each, is shown in figure 4.

Zones of Damage	Light Duty		Heavy Duty		Total Rescues
	Est. percent	Number	Est. percent	Number	
A-----	0	None	0	None	None
B-----	10	360	90	3,240	3,600
C-----	90	19,845	10	2,205	22,050
D-----	100	24,000	0	None	24,000
Total-----	-----	44,205	-----	5,445	49,650

FIGURE 4.—Breakdown of light and heavy duty rescues for hypothetical city.

MAIN TOPICS	TEACHING POINTS
D. TACTICAL RESCUE OPERATIONS—Con.	<p>c. To find the number of rescue squads required, the following formulas should be used:</p> $\frac{\text{No. of light duty rescues} \times 2}{768} = \text{number of light duty rescue squads required}$ $\frac{\text{No. of heavy duty rescues} \times 20}{768} = \text{number of heavy duty rescue squads required}$ <p>The 2 represents the man-hour requirements for one light duty rescue, the 20, man-hour requirements for one heavy duty rescue. The 768 is a squad's man-hour capability.</p> <p>Using these formulas, we find that Metropolis City needs 116 light duty rescue squads and 141 heavy duty rescue squads, as follows (results are rounded off to the nearest whole number):</p>

	Light duty	Heavy duty
Zone A	0	0
Zone B	$\frac{360 \times 2}{768} = 1$	$\frac{3240 \times 20}{768} = 84$
Zone C	$\frac{19,845 \times 2}{768} = 52$	$\frac{2205 \times 20}{768} = 57$
Zone D	$\frac{24,000 \times 2}{768} = 63$	0
Total	116	141

FIGURE 5.—Number of rescue squads required for hypothetical city.

7. Cooperation with other services.
 - a. Communications.—In addition to its assigned facilities the rescue service will have access to communications facilities of other services.
 - b. Fire.—The rescue service will maintain close liaison with the fire services on direction and rate of fire travel and other dangers affecting rescue operations. Assistance may be required in the control of secondary fires that hamper rescue operations.
 - c. Medical.—Rescuers will give emergency first aid only during release of casualties who will then be turned over to litter-bearer teams for care and disposition.
 - d. Radiological.—A member of each rescue team should be trained in radiological monitoring to supplement available radiological personnel. This will be a secondary duty.
 - e. Industrial defense.—The rescue service works in close liaison with industrial defense personnel, particularly on plant features that make rescue more difficult, such as underground fuel storage, structures especially hazardous to rescue operations, and explosive and toxic agents used in manufacturing.

MAIN TOPICS	TEACHING POINTS
<p>D. TACTICAL RESCUE OPERATIONS—Con.</p>	<ul style="list-style-type: none"> f. Police.—The rescue service may require assistance from the police in keeping working areas clear and calming disaster victims. g. Public information.—Rescue service will make reports on rescue operations and persons recovered. These reports will be used in compiling casualty lists and as a basis for releases by public information on the status of civil defense operations. h. Engineering.—The rescue service depends on the engineering services for heavy equipment, such as cranes, power shovels, and bulldozers. These are furnished with operating personnel. i. Supply.—The rescue service depends upon the supply service for replenishment of supplies, materials, and equipment. j. Transportation.—The rescue service depends upon the transportation service, not only for initial means of transport where needed, but for additional vehicles required in deployment of rescue forces. k. Welfare.—The rescue service may request that the welfare service feed rescuers and provide rest facilities during lengthy rescue operations. l. Warden.—The rescue service will obtain from the warden service general information about the area of operation.
<p>E. STAGES OF RESCUE</p>	<p>The squad leader should know the four stages of rescue so he can plan his operation logically.</p> <p>(The FCDA filmstrip "Reconnaissance and Rescue by Stages" may be shown here or at the end of this lesson.)</p> <p><i>Stage I, Immediate Rescue.</i></p> <p>Immediate rescue takes place after initial size-up and before completion of general reconnaissance. It includes persons who can be seen or heard and those in shelters and other areas where the exact location is known.</p> <p><i>Stage II, Exploration.</i></p> <p>Exploration consists of searching places where trapped persons are likely to be found, such as:</p> <ul style="list-style-type: none"> a. Strong and sheltered parts of buildings. b. Specially constructed shelters. c. Spaces under stairways. d. Spaces in basements. e. Locations near chimneys. f. Spaces under partially collapsed floors. g. Rooms with exits blocked by debris. h. Fringe area buildings which may contain lightly trapped persons suffering from shock, cuts, or fractured bones. <p>Exploration should never be omitted. It may be carried on at the same time as Stage III.</p> <p><i>Stage III, Selected Debris Removal.</i></p> <ul style="list-style-type: none"> 1. Although some debris removal is necessary in Stages I and II, Stage III covers more thorough debris removal. It takes place when persons are still known to be missing, but can neither be seen nor heard. 2. This stage is carried out according to plan based on: <ul style="list-style-type: none"> a. Last known location of the person. b. Location and condition of debris. c. Direction victim may have fallen during collapse of structure. d. Location of voids formed by collapse.

MAIN TOPICS	TEACHING POINTS
E. STAGES OF RESCUE— Continued	<ol style="list-style-type: none"> 3. With good judgment, rescuers may often locate trapped persons by a "calling and listening" method. 4. Debris is removed up to the probable location of trapped persons. 5. The squad leader then decides the method of rescue and the use of his men and equipment. 6. Bystanders can be put to work under supervision of the rescue team members. <p><i>Stage IV, General Rubble Clearance.</i></p> <ol style="list-style-type: none"> 1. General rubble clearance is the method used after all other methods have been used and persons are still missing. This consists of stripping the area systematically. 2. This work must be done rapidly and with extreme care. Special equipment may have to be requested from other civil defense services. Unless every precaution is taken, victims may be further injured or killed. 3. General rubble clearance should not be confused with the removal of rubble to clear a site as a cleanup job.
F. REPORTS	<ol style="list-style-type: none"> 1. Team reports should be completed at the end of a shift and turned over to the squad leader. 2. The team report should include: <ol style="list-style-type: none"> a. Location of rescue site. b. Date, time, and team identification. c. Total number of persons rescued during the period covered by the report. <ol style="list-style-type: none"> (1) Names and addresses of those rescued if known. (2) Disposition of persons rescued. d. Team status—whether rescue operations are continuing, suspended, or completed; whether team has been relieved before completion or suspension of operations or transferred to another rescue site. e. Team leader's signature. 3. The squad leader should incorporate team reports into his periodic report to the chief of the rescue service at main control through zone control at least once every 24 hours, preferably oftener, depending on the situation. His report should include: <ol style="list-style-type: none"> a. Location of rescue site. b. Date, time, and squad number or identification. c. Number of persons rescued. <ol style="list-style-type: none"> Names and addresses of those rescued if known. d. Injuries and fatalities to rescuers. e. Injuries and fatalities to persons assisting rescuers (including names, disposition, and remarks). f. Squad status—whether rescue operation has been completed, suspended, or transferred to another rescue site. g. Signature of squad leader.
G. TERMINATION OF OPERATIONS	<p>Rescue squad leader should contact the zone for further assignment after completion of the job.</p>

STUDENT PARTICIPATION:

Discussion of light duty rescue in survival planning should be encouraged. Trainees should also be encouraged to work out problems similar to those in the lesson plan to understand the formula.

The instructor should conduct problems on the training ground that require application of the stages of rescue.

HANDOUT MATERIALS AVAILABLE:

None.

LESSON AIDS

2—Care and Use of Truck, Tools, and Equipment

The instructor should contact rescue vehicle manufacturers for instructional material on the vehicles and equipment used in the course. The presentation should be geared to the truck and equipment on hand.

The instructor should expand this lesson as he sees fit.

LESSON PLAN NO. 2

COURSE: Light Duty Rescue—Course No. 14.2

LESSON TITLE: Care and Use of Truck, Tools, and Equipment

TIME: 1 hour

TRAINING MATERIALS:

Fully equipped light rescue truck.

REFERENCE:

Instructional material from vehicle manufacturers.

MOTIVATION:

Because the vehicle is small, the number of equipment items is limited. Maximum use should be made of the equipment available.

MAIN TOPICS	TEACHING POINTS
A. TRUCK	<p>Explanation by instructor.</p> <ol style="list-style-type: none">Purpose.—Serves as a mobile unit with standard tools and equipment capable of supporting distant target areas.Special features.<ol style="list-style-type: none">Carries its own crew of four men.Tools and equipment are compartmented and grouped according to operational use.4-wheel drive.Winch.Size, weight, horsepower, and make.Capabilities.Availability under Federal Contributions Program.
B. EQUIPMENT	<p>Explanation by instructor.</p> <ol style="list-style-type: none">Types of equipment.Compartmentation and location of equipment in truck.Availability under Federal Contributions Program.
C. INSPECTION	<ol style="list-style-type: none">Instructor should take his class members around and through the truck and briefly point out its features.He should stress the importance of all team members knowing how to maintain and handle the truck.
D. MAINTENANCE	<p>Importance of proper maintenance.</p>
E. 4-WHEEL DRIVE	<ol style="list-style-type: none">A conventional 2-wheel drive vehicle applies power to the 2 rear wheels only. The front wheels coast along, pushed by the driving thrust of the rear wheels.A 4-wheel drive vehicle doubles its tractive power by using another powered axle to drive the front wheels. It gets its tractive power from all 4 wheels working together.Instructor should demonstrate the engagement of the 4-wheel drive.

MAIN TOPICS	TEACHING POINTS																																																																														
F. WINCH	<ol style="list-style-type: none">1. The light rescue truck has a front-mounted winch with a 6,000-pound working capacity and 150 feet of $\frac{5}{16}$-inch steel cable.2. Instructor should demonstrate use of the winch.																																																																														
G. SELECTION OF RESCUE EQUIPMENT	<ol style="list-style-type: none">1. Light duty rescue tools and equipment should be selected from one of the following:<ol style="list-style-type: none">a. Truck without rescue tools and equipment, per FCDA Standard Item Specification No. CD VIII-166.b. Truck with standard rescue tools and equipment, per FCDA Standard Item Specification No. CD VIII-167.c. Truck with standard and supplementary rescue tools and equipment, per FCDA Standard Item Specification No. CD VIII-168.d. Standard tools and equipment, per FCDA Standard Item Specification No. CD VIII-169.e. Supplemental tools and equipment, per FCDA Standard Item Specification No. CD VIII-170.2. The standard tools and equipment, per FCDA Standard Item Specification No. CD VIII-169 (d above), include the following:<table><tr><th>CD item number</th><th>Description</th><th>Quantity per set</th></tr><tr><td>VIII-4</td><td>Bands, webbing, for casualty handling (set of 4)</td><td>1</td></tr><tr><td>VIII-150</td><td>Bar, wrecking, $\frac{1}{2}$"\times12" long, gooseneck claw and pinch point.</td><td>2</td></tr><tr><td>VIII-7</td><td>Bar, wrecking, 1"\times30" long, gooseneck, claw and pinch point.</td><td>2</td></tr><tr><td>VIII-12</td><td>Blankets, (cotton and wool)</td><td>4</td></tr><tr><td>VIII-138</td><td>Blankets (paper)</td><td>4</td></tr><tr><td>VIII-13</td><td>Boots, rubber, pullover, shoe (pair)</td><td>4</td></tr><tr><td>VIII-151</td><td>Box, tool, 19"\times7"\times7"</td><td>1</td></tr><tr><td>VIII-15</td><td>Buckets, galvanized, 14-qt. (heavy gauge)</td><td>2</td></tr><tr><td>VIII-16</td><td>Can, safety, oil, 1-gal</td><td>1</td></tr><tr><td>VIII-19</td><td>Chain, 6 ft. 5,000 lbs., close link, type A, class I, grade II, grab hook and ring.</td><td>1</td></tr><tr><td>VIII-17</td><td>Canteens, wo/cup</td><td>4</td></tr><tr><td>VIII-21</td><td>Chisel, hand, cold, $\frac{3}{4}$"\times12"</td><td>2</td></tr><tr><td>VIII-25</td><td>Coats, rain, jacket, medium length</td><td>4</td></tr><tr><td>VIII-26</td><td>Container, debris, bucket type</td><td>2</td></tr><tr><td>VIII-27</td><td>Container, water, drinking, 5-gal. capacity</td><td>1</td></tr><tr><td>VIII-28</td><td>Cord, sash, cotton braided, 15' long</td><td>4</td></tr><tr><td>VIII-152</td><td>Cord, whipping, ball</td><td>2</td></tr><tr><td>VIII-29</td><td>Coveralls, 2 medium, 2 large</td><td>4</td></tr><tr><td>VIII-31</td><td>Crayon, lumber marking, red, yellow</td><td>6</td></tr><tr><td>IV-26</td><td>Extinguisher, water, hand pump, 4-gal</td><td>1</td></tr><tr><td>VIII-41</td><td>Gloves, heavy debris (pair)</td><td>4</td></tr><tr><td>VIII-154</td><td>Gloves, leather, protective</td><td>1</td></tr><tr><td>VIII-42</td><td>Gloves, rubber, insulating (pair)</td><td>1</td></tr><tr><td>VIII-44</td><td>Goggles, dustproof, shatterproof</td><td>4</td></tr><tr><td>VIII-45</td><td>Hacksaw, frame, w/10 blades</td><td>1</td></tr></table>	CD item number	Description	Quantity per set	VIII-4	Bands, webbing, for casualty handling (set of 4)	1	VIII-150	Bar, wrecking, $\frac{1}{2}$ " \times 12" long, gooseneck claw and pinch point.	2	VIII-7	Bar, wrecking, 1" \times 30" long, gooseneck, claw and pinch point.	2	VIII-12	Blankets, (cotton and wool)	4	VIII-138	Blankets (paper)	4	VIII-13	Boots, rubber, pullover, shoe (pair)	4	VIII-151	Box, tool, 19" \times 7" \times 7"	1	VIII-15	Buckets, galvanized, 14-qt. (heavy gauge)	2	VIII-16	Can, safety, oil, 1-gal	1	VIII-19	Chain, 6 ft. 5,000 lbs., close link, type A, class I, grade II, grab hook and ring.	1	VIII-17	Canteens, wo/cup	4	VIII-21	Chisel, hand, cold, $\frac{3}{4}$ " \times 12"	2	VIII-25	Coats, rain, jacket, medium length	4	VIII-26	Container, debris, bucket type	2	VIII-27	Container, water, drinking, 5-gal. capacity	1	VIII-28	Cord, sash, cotton braided, 15' long	4	VIII-152	Cord, whipping, ball	2	VIII-29	Coveralls, 2 medium, 2 large	4	VIII-31	Crayon, lumber marking, red, yellow	6	IV-26	Extinguisher, water, hand pump, 4-gal	1	VIII-41	Gloves, heavy debris (pair)	4	VIII-154	Gloves, leather, protective	1	VIII-42	Gloves, rubber, insulating (pair)	1	VIII-44	Goggles, dustproof, shatterproof	4	VIII-45	Hacksaw, frame, w/10 blades	1
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MAIN TOPICS

TEACHING POINTS

G. SELECTION OF RESCUE EQUIP- MENT—Continued

<i>CD item number</i>	<i>Description</i>	<i>Quantity per set</i>
VIII-47	Hammer, sledge, 4-lb. w/handle	1
VIII-48	Hammer, sledge, 8-lb. w/handle	1
VIII-116	Hatchet, carpenter's	2
VIII-50	Helmet, protective, wo/lighting bracket	4
VIII-156	Hydraulic spreading and pulling set, 4-ton cap., in case.	1
VIII-53	Jack, screw, 5-ton cap., w/handle	2
VIII-38	Kit, first aid, belt type, filled; w/1 refill	4
VIII-157	Ladder, extension, 20', 2 section	1
VIII-67	Lights, safety approved, battery	4
VIII-163	Plier-wrench, type U, class 1, style 1, 8½"	2
VIII-71	Pliers, 8", elec., wirecutting, w/ins. handle	2
VIII-80	Rope, Manila, ½" dia., 50' lengths	4
VIII-141	Rope, Manila, ½" dia., 150' lengths	2
VIII-160	Rope, Manila, ¾" dia., 100' lengths	3
VIII-78	Rope, wire, ¾" dia., 10' long, type VIIa spliced loop ends.	2
VIII-129	Ruler, folding, carpenter's, wood, 6'	2
VIII-86	Saw, hand, 26" cutting edge	2
VIII-88	Screwdriver, 16½", common	2
VIII-161	Snip, tin, 8½", type II, class A	1
VIII-89	Sheeting, rubber, black, 45" wide, 84" long	4
VIII-162	Shovel and pick combination	2
VIII-171	Snatch block, steel; heavy duty, type II, class 2, Size 1, 8" (for wire rope).	1
VIII-94	Stakes, metal, 1" dia., 30" long	4
VIII-95	Stretcher, latest Army type (canvas)	2
VIII-124	Stretcher, Stokes type	1
VIII-143	Tackle block, Manila rope, 4" (2-sheave) w/becket	2
VIII-164	Wrench, pipe, adjustable, heavy duty, 14"	2

4. Supplemental tools and equipment, per FCDA Standard Item Specification No. CD VIII-170 (e above), include the following:

<i>CD item number</i>	<i>Description</i>	<i>Quantity Per set</i>
VIII-125	Cord, extension, 100', for flood lights w/wye	1
VIII-126	Cord, extension, 50', for flood lights w/wye	2
VIII-153	Clipper, bolt, ¼", 18" long, type II, class C	1
VIII-139	Hammer, cross-peen, 3-lb., w/handle	1
VIII-155	Hoist, winch type, portable, ¼-ton cap	1
VIII-165	Inhalator, portable, w/case	1
VIII-51	Jack, ratchet, 5-ton cap., w/lever	2
VIII-56	Ladder, roof, 12' w/folding hooks	1
VIII-158	Light, flood, portable, generator powered	2
VIII-119	Lights, red-flashing, battery powered	2
VIII-159	Power unit, gas driven, 1-kw. portable, AC	1
VIII-87	Saw, pruning, dbl. edge, 18" blade	1

MAIN TOPICS	TEACHING POINTS		
G. SELECTION OF RESCUE EQUIP- MENT—Continued	<i>CD item number</i>	<i>Description</i>	<i>Quantity per set</i>
	*V-800-----	Masks, filter-----	4
	**V-750-----	Radiological dosimeter charger-----	1
	**V-740-----	Radiological dosimeters, self-reading-----	4
	**V-710-----	Radiological survey meter-----	1
	***V-100----	Radio, mobile, 2-way-----	1

*CD Item V-800 is available under the Health and Special Weapons Defense Contributions Program. See chapter 8, FCDA Manual M25-1.

**CD Items V-750, V-740, V-710 are available under the Health and Special Weapons Defense Contributions Program; training sets are furnished in accordance with FCDA Advisory Bulletin No. 193. See also chapter 8, FCDA Manual M25-1.

***CD Items in group V-100 are available under the Communications Contributions Program; the specific item is selected in accordance with local communications plan. See chapter 9, FCDA Manual M25-1.

STUDENT PARTICIPATION:

- Questions and answers.
- Inspection of truck and equipment.

HANDOUT MATERIALS AVAILABLE:

The instructor should contact the manufacturer of the truck for literature that may be passed out to trainees.

A fact sheet may be reproduced and used as a handout.

LESSON AIDS

3—Care and Use of Ladders (Part II)

The instructor should review Lesson Plan 8, Basic Rescue Course, 14.1, and emphasize the proper positioning of ladders, including the proper angle for safe climbing and assurance of maximum strength under heavy loads. The heel of the ladder should be placed at a distance from the base of the wall about one-fourth of the height to be reached. For roof climbing, the top of the ladder should extend approximately 4 feet above the stepping-off point. For window entry, the ladder should be placed against the sill, with two rungs extending through the window and one beam resting against a side of the window frame.

The following points should be reemphasized:

1. In climbing ladders, good rhythm is essential.
2. To acquire this rhythm, step on every rung and grasp either alternate or consecutive rungs while ascending.
3. Never climb with the hands on the beams of the ladder.
4. Climb near the center of the rungs on the balls of the feet and keep the upper part of the body almost at arm's length from the ladder.
5. Always look straight ahead or up but never down until familiar with ladders and climbing.
6. Never run up or down a ladder, but climb steadily and smoothly.

The importance of never leaving the ladder unattended should be impressed on the trainee.

The top of the ladder should be secured. The heel should be held either by a man or by pickets.

LESSON PLAN NO. 3

COURSE: Light Duty Rescue Course No. 14.2

LESSON TITLE: Care and Use of Ladders (Part II)

TIME: 1 hour

TRAINING MATERIALS:

One 10' wall ladder per 2 teams.

One extension ladder per 2 teams.

One $\frac{3}{4}$ " x 100' rope per teams.

One $\frac{1}{2}$ " x 50' lashing line per trainee.

Three pairs iron stakes.

One facility with second story windows.

(Although 3 ladders are recommended for training a squad simultaneously, round robin training with 1 or 2 ladders may be given.)

REFERENCE:

Rescue Techniques and Operations, FCDA, TM-14-1, chapters 2 and 4.

MOTIVATION:

Ladders are an important part of rescue equipment. Their proper use is particularly important to light duty rescue squads because they will do some rescue from heights.

MAIN TOPICS	TEACHING POINTS
A. PURPOSE	Training in proper positioning of ladders in rescue from heights and across gaps.
B. APPROACH	1. Brief review of ladder nomenclature. (See Lesson Plan 8, Basic Rescue Course No. 14.1.) 2. Brief review of handling. 3. Explanation of the importance of ladders in the jobs ahead.
C. PREPARATION AND POSITIONING OF LADDERS	1. Stretcher slide—position and securing. 2. Stretcher lower—ladder position, guy lines, anchorage, and lashing. 3. Life basket—proper threading of lowering rope through rungs of ladders. 4. Bridging a gap. a. Straight beam ladder across a span, such as an alleyway. b. Proper procedure in moving personnel or casualty-lashed stretcher across span. 5. Ladder splicing.

STUDENT PARTICIPATION:

Trainees should do all the work listed in this lesson plan.

HANDOUT MATERIALS AVAILABLE:

None.

LESSON AIDS

4—Rescue From Limited Heights

Rescue from limited heights, which is rescue from first and second stories only, is part of light duty rescue. Rescue above the second story is part of heavy duty rescue. Light duty rescue forces will usually be assigned to residential areas where buildings seldom exceed two stories.

In searching for casualties, rescuers should be careful not to become casualties themselves. An injured rescuer causes extra work for his team members. Not only do they lose his services, but they may have to help him too. Rescuers should avoid the center of floors, particularly above the first story. They should keep as close to walls as possible. They should work in groups of two, searching systematically and thoroughly, and keeping their team leader informed.

When they reach a casualty, they should recommend to their leader the type of rescue needed based on the casualty's condition. The casualty may be able to give information about other trapped persons. The leader will decide the priority of rescue.

LESSON PLAN NO. 4

COURSE: Light Duty Rescue Course No. 14.2
LESSON TITLE: Rescue from Limited Heights

TIME: 2 hours

TRAINING MATERIALS:

- One 10' wall ladder per 2 teams.
- One extension ladder per 2 teams.
- One $\frac{3}{4}$ " x 100' rope per 2 teams.
- One $\frac{1}{2}$ " x 50' lashing line per trainee.
- One canvas stretcher per 2 teams.
- One Stokes stretcher per 2 teams.
- Two blankets per stretcher.
- One pair iron stakes per 2 teams.
- One facility with second story windows.

REFERENCE:

Rescue Techniques and Operations, FCDA, TM-14-1, chapter 4.

MOTIVATION:

Rescue from heights calls for careful action of rescuers. Lost motion must be avoided. The type of injury must be considered in making a decision on the method of rescue to use. The ability of the leader to make the proper decision and the faith of the leader in his men are of utmost importance.

MAIN TOPICS	TEACHING POINTS
A. PURPOSE	Training in proper techniques of rescue from heights.
B. METHODS	<ol style="list-style-type: none">a. At least 2 teams (8 men) should take part in each rescue.1. Stretcher slide from second story window.<ol style="list-style-type: none">a. This method is used when stretcher cannot be carried out because of obstacles or other hazards.b. Proper placement of ladder under window sill.c. Securing of ladder to avoid slipping.d. Proper position of rescuers.e. Insertion of stakes through D rings on the stretcher, and with marline or other whipping cord securing them to the D rings to make movement of stretcher over ladder beams possible.f. Position of rescuer on ladder.2. Using a ladder as an improvised stretcher (casualty lowered from second story window).<ol style="list-style-type: none">a. Preparation of ladder, using same techniques as for canvas stretcher, with the following additions:<ol style="list-style-type: none">(1) Place board over top of rungs for comfort of casualty.(2) Start lashing—secure clove hitch to beam, straddling a rung.(3) Complete lashing with clove hitch to opposite beam.b. Lowering of casualty.

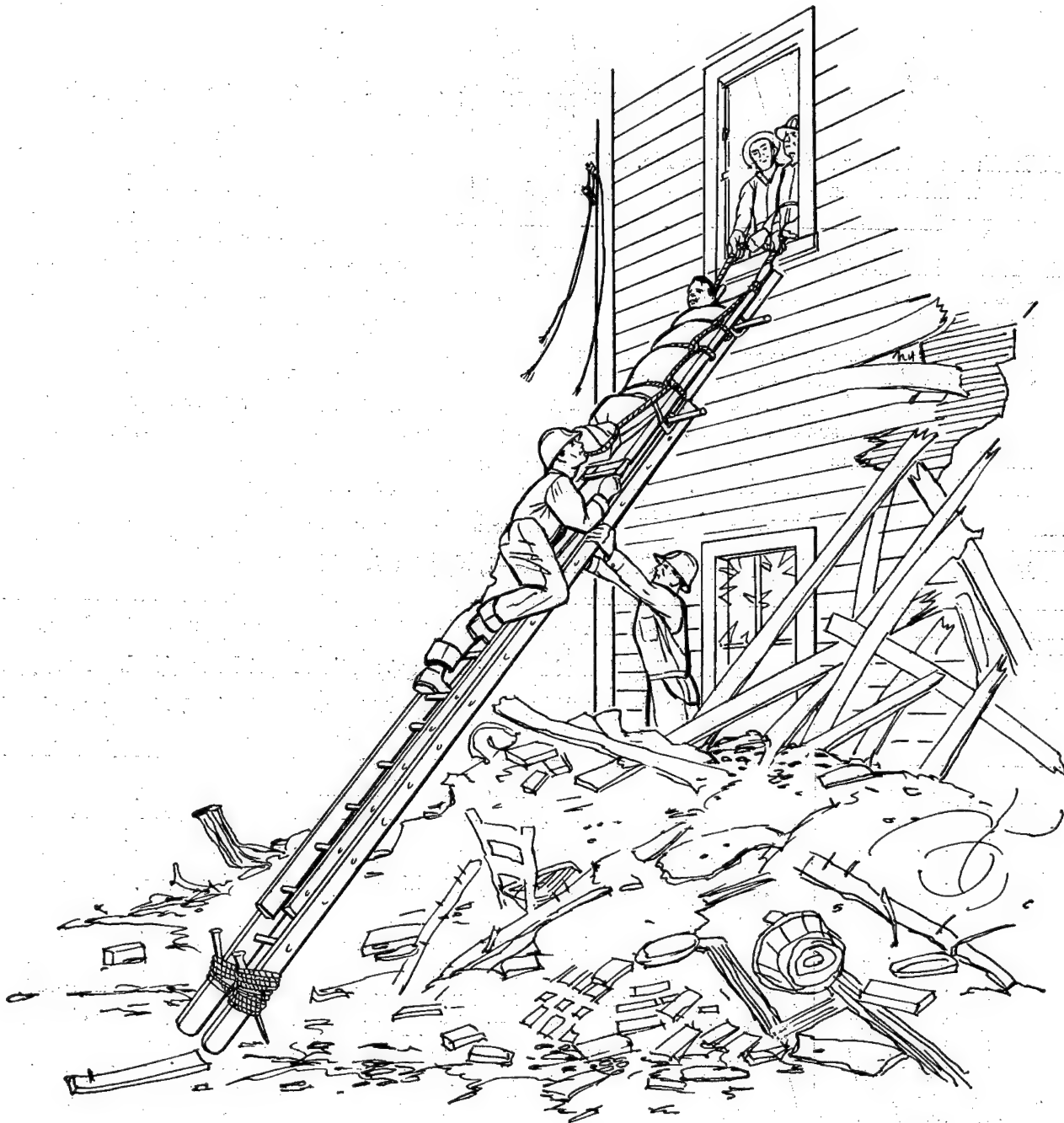


FIGURE 6.—Stretcher slide from second story window.

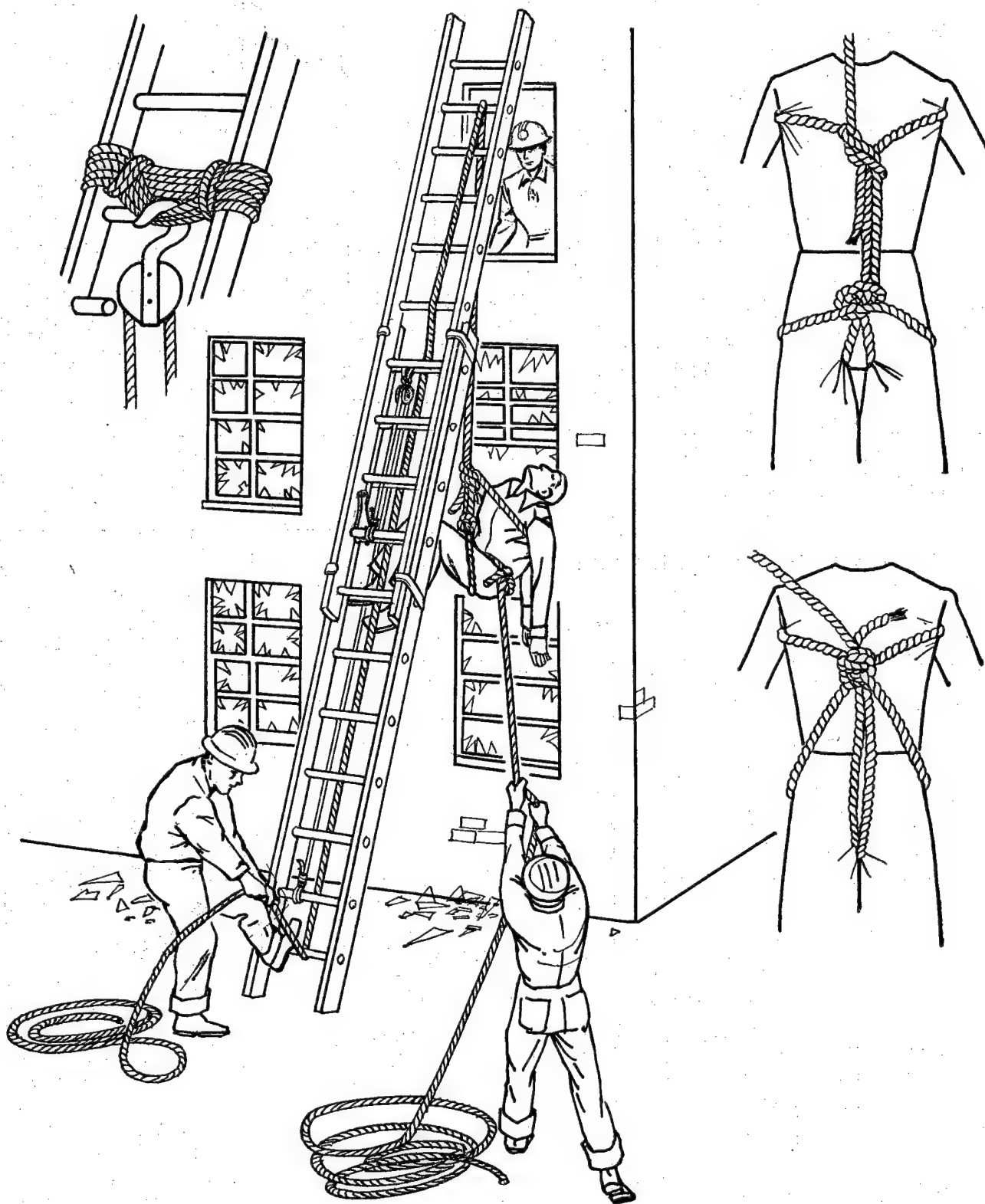


FIGURE 7.—Life basket.

MAIN TOPICS	TEACHING POINTS
B. METHODS—Con.	<ol style="list-style-type: none"> 3. Stokes stretcher.—The instructor should explain the Stokes stretcher and point out its advantages over the canvas stretcher. 4. Life basket. <ol style="list-style-type: none"> a. When used. b. Positioning extension ladder. c. Threading lowering rope through the rungs of the ladder. d. Making life basket (double bowline or bowline-on-a-bight with chest safety hitch). e. Each trainee should prepare a life basket and be lowered in it from a second story window. 5. Bridging a gap. (See figure 88, TM-14-1.) <ol style="list-style-type: none"> a. Putting a straight beam ladder across a span. b. Moving personnel or stretcher across span.

STUDENT PARTICIPATION:

Trainees should practice all rescue methods under supervision of instructor.

HANDOUT MATERIALS AVAILABLE:

None.

LESSON AIDS

5—Shoring and Bracing (Part I)

When buildings collapse, sections often hold together to form voids. Sections raised to allow rescue workers to enter voids must be supported or braced.

Walls in danger of collapsing also may have to be shored or braced to protect trapped casualties and rescue workers.

Timber salvaged from the debris should be used in shoring and bracing, if possible. If more is needed, it may have to be obtained from nearby lumber yards. As a last resort, lamination, putting together short sections of smaller dimension timber, may be used. If this is done, care must be taken to overlap and nail the pieces together securely. All well equipped rescue squads carry items, such as oak blocking and wedges, that are not on the regular equipment list.

LESSON PLAN NO. 5

COURSE: Light Duty Rescue—Course No. 14.2

LESSON TITLE: Shoring and Bracing (Part I)

TIME: 2 hours

TRAINING MATERIALS:

Blackboard, chalk, eraser.

For raking shore, the following per 2 teams:

Raker.

Soleplate or bearing plate.

Wallplate.

Eight pair wedges (wood).

Cleats (wood).

Claw hammers.

Pry bars.

Hand saw.

Nails.

Miniature model (optional).

For dead or vertical shore, the following per 2 teams:

Three timbers (length required by conditions).

Lumber for bracing.

Wedges (wood).

Claw hammer.

Hand saw.

Nails.

Miniature model (optional).

REFERENCE:

Rescue Techniques and Operations, FCDA, TM-14-1.

MOTIVATION:

To protect rescue workers and trapped casualties, precautions must be taken to prevent further collapse of damaged buildings. Walls, ceilings, or other parts of structures may need support. In most instances, temporary supports can be erected quickly.

MAIN TOPICS	TEACHING POINTS
A. DEFINITION	<ol style="list-style-type: none">Shoring, as used in rescue operations, is the erection of a series of timbers to strengthen a floor or wall or stabilize debris to prevent further collapse of a building while rescue operations are being carried on.<ol style="list-style-type: none">The purpose is to protect lives of rescue workers and casualties.Shoring in rescue operations is temporary; permanent shoring is the responsibility of the engineering services.Main types.<ol style="list-style-type: none">Raking shore.Dead or vertical shore.Flying shore (taught in Heavy Duty Rescue Course No. 14.3).

MAIN TOPICS	TEACHING POINTS
B. PRECAUTIONS	<ol style="list-style-type: none"> 1. Do not attempt to restore walls to original position with shores. 2. Forcing portions of structures may cause further collapse. 3. Secure shores firmly, gently, and gradually, without shock to the structure, using pry bars and wedges or jacks. Wedges should be tapped rather than hammered into position.
C. RAKING SHORE	<ol style="list-style-type: none"> 1. The purpose of the raking shore is to brace a wall that is bulging or out of plumb and in danger of collapse. 2. On blackboard, sketch a raking shore, naming the principal parts: <ol style="list-style-type: none"> a. Wallplate. b. Raker. c. Soleplate or bearing plate. d. Wood wedges. e. Cleats.

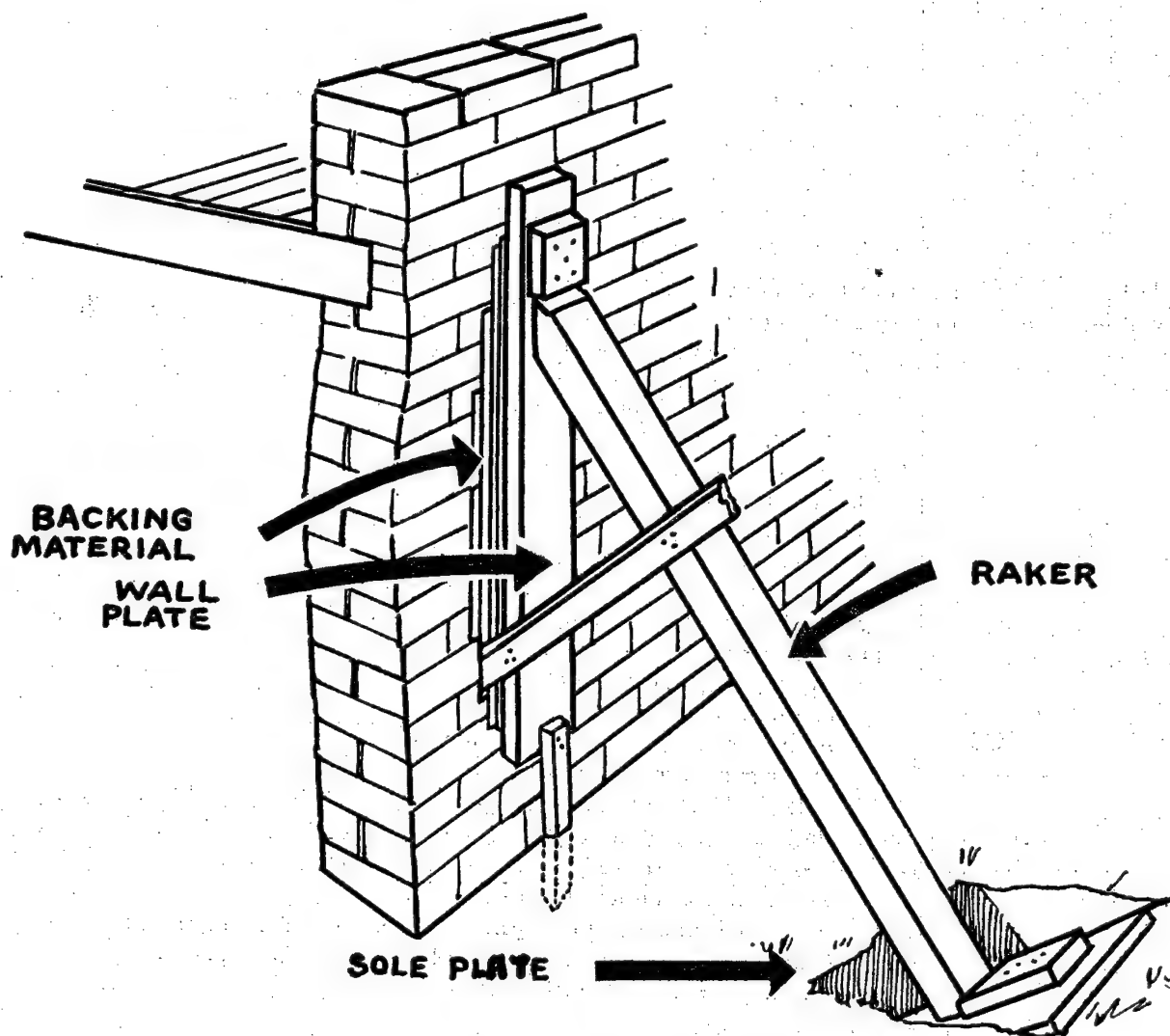


FIGURE 8.—Raking shore.

MAIN TOPICS	TEACHING POINTS
C. RAKING SHORE— Continued	<ol style="list-style-type: none"> 3. The wallplate should, as far as possible, have continuous bearing throughout its length. If wall bulges, wallplate should be backed with packing pieces to give it a continuous bearing. 4. Rakers are best formed with square timbers. One to four may be required, depending on the number of floors carried by the wall. 5. Each raker butts against a cleat at the wallplate. 6. The wall plate may have to be secured to the wall to prevent sliding when rakers are tightened into place. 7. The sole plate should be large enough to distribute the load over the ground—the softer the ground, the greater the area of soleplate. The sole plate should be placed so that it is at approximately right angles to the thrust of the raker. If the ground can be dug, the soleplate should be laid in a wedge-shaped hole. If not, it may have to be built up above the ground to the required angle and wedged to prevent movement. 8. Steps in erection of raker: <ol style="list-style-type: none"> a. Nail cleats to wallplate. b. Cut raker. c. Prepare soleplate or bearing plate. d. Place wallplate in position. e. Place raker in position. f. Fix struts or braces required. 9. Raking shores are usually placed along a wall at eight- to ten-foot intervals.
D. DEAD OR VERTICAL SHORE	<ol style="list-style-type: none"> 1. The purpose of the dead or vertical shore is to support dead weight and protect casualties or rescue workers from danger of further collapse of structure. 2. On blackboard, sketch a dead or vertical shore, naming the parts: <ol style="list-style-type: none"> a. Solepiece or bearing plate. b. Headpiece, header or beam. c. Main shore. d. Wood wedges. 3. The main shore should be made of square timber heavy enough to carry the maximum expected load. 4. It is difficult to estimate what load a vertical timber must carry and to gauge what load it can support. However, in shoring, the following principles apply: <ol style="list-style-type: none"> a. For a given size of timber, the shorter the piece, the greater the load it can carry. b. A timber of square cut cross section is stronger than a rectangular one of the same cross section area. c. A timber will be much stronger in service if its ends are cleanly cut so they fit squarely to the bearing plate and beam. d. Shores should always be a little heavier than seems necessary. The size used will be determined by the weight of the wall or floor to be supported, and by the height of the shore. Rule of thumb: S. W. L. (safe working load—if new material): 500 lbs. per square inch in column lengths of less than 10 feet.

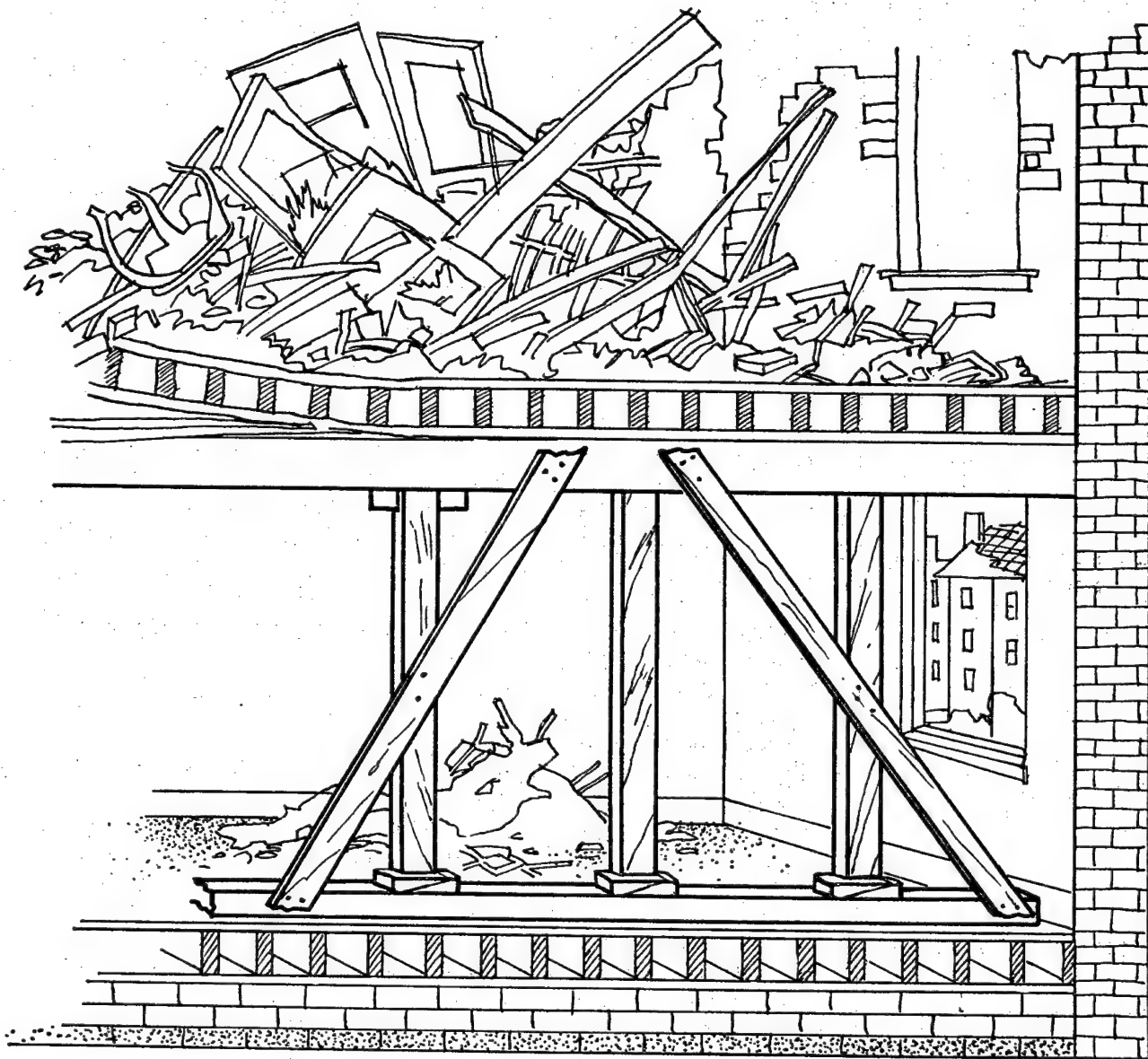


FIGURE 9.—Dead or vertical shore.

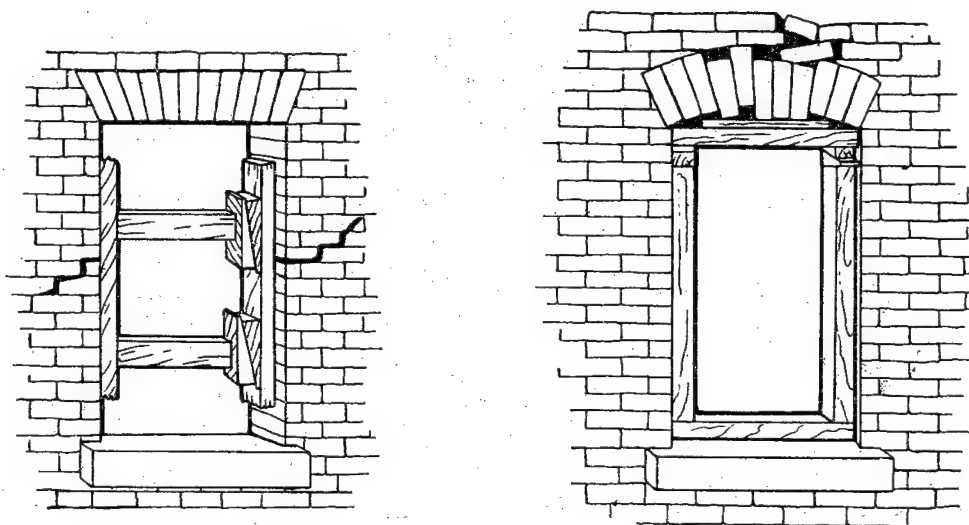


FIGURE 10.—Strutting window openings.

MAIN TOPICS	TEACHING POINTS
D. DEAD OR VERTICAL SHORE—Continued	<ol style="list-style-type: none"> 5. Wedges are set under the main shore. The shore is eased into position with the wedges until it just takes the weight. Wedges should not be made tighter, because that would lift the wall or floor being supported and might cause more damage to the building. 6. The bearing plate should be cut of adequate size timber to spread the load over several floor beams. If the floor is reinforced concrete without reinforced concrete beams, a platform can be made to make it safe for carrying the load. It should be as long and as wide as practical to spread the load over a sizable area. 7. Materials which can crumble, such as rock and brick, should never be used for bearing plate.
E. STRUTTING	<ol style="list-style-type: none"> 1. Strutting is used to strengthen window and door frames made unsafe by cracked or damaged walls. 2. Two methods of strutting are shown in figure 10. The instructor should sketch both on the blackboard and discuss them.

STUDENT PARTICIPATION:

The instructor should divide the class into teams, giving each a shoring problem. On completion of a shore, the instructor should examine and discuss it with the team.

HANDOUT MATERIALS AVAILABLE:

None.

LESSON AIDS

6—Rescue From Basements

To rescue from basements rescuers should first learn the layout of the basement and its entrances and exits, including windows, coal chutes, and manholes.

LESSON PLAN NO. 6

COURSE: Light Duty Rescue—Course No. 14.2

LESSON TITLE: Rescue from Basements

TIME: 2 hours

TRAINING MATERIALS:

A rescue training facility.

Filmstrip, projector, screen.

Filmstrip "Rescue from Basements".

REFERENCE:

Rescue Techniques and Operations, FCDA, TM-14-1.

MOTIVATION:

People may be trapped in basements by collapse of the floor above or debris-blocked exits.

MAIN TOPICS	TEACHING POINTS
A. OBJECTIVES	To learn how to rescue persons trapped in basements.
B. PROCEDURE	<ol style="list-style-type: none"> 1. Squad leader determines location of victims in basement on the basis of: <ol style="list-style-type: none"> a. Reconnaissance by squad members. b. Information from people on the scene. <ol style="list-style-type: none"> (1) Warden. (2) Neighbors. (3) Released victims. 2. The squad leader's approach to a basement rescue will depend on: <ol style="list-style-type: none"> a. Condition of the demolished building. b. Amount of debris obstructing entry. c. Feasibility of approach through debris to exits. d. Feasibility of approach from upper floors. e. Time required.
C. METHODS	<ol style="list-style-type: none"> 1. Victims should be removed from basement by one of the following methods: <ol style="list-style-type: none"> a. Lashed to a stretcher and passed through window. b. Lashed to a stretcher and carried out by the stairs. c. Lashed to a stretcher and taken to the first story through a hole in the floor. d. Lift to the first story by 4-point suspension (for casualties with serious back injuries). 2. The instructor should explain the above rescue techniques and the reason for each. 3. Trainees should practice each technique under supervision of the instructor. He should check particularly the following: <ol style="list-style-type: none"> a. Information obtained by rescuer from casualty. b. First aid handling. c. Stretcher lashing. d. Casualty transporting.

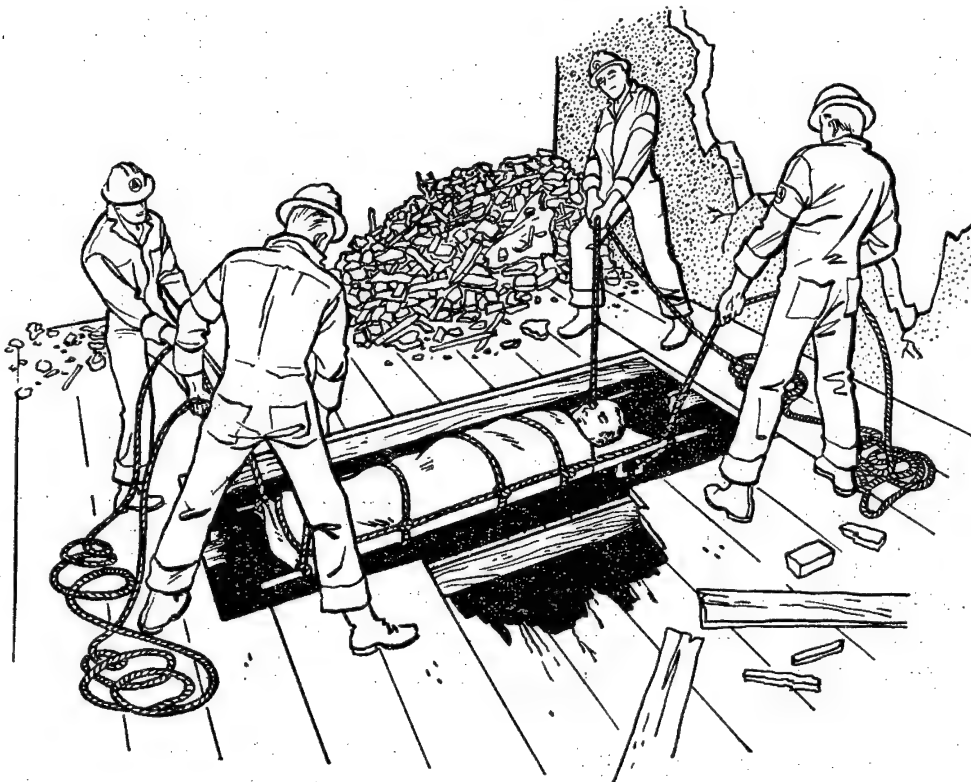


FIGURE 11.—4-point suspension.

MAIN TOPICS	TEACHING POINTS
C. METHODS—Con.	<p>4. 4-point suspension.</p> <ul style="list-style-type: none"> a. This method is used when the casualty must be moved in a horizontal position because of back injuries. b. Stretcher should be lifted carefully to avoid further injury to casualty.

STUDENT PARTICIPATION:

Trainees should practice the techniques of rescue from basements.

HANDOUT MATERIALS AVAILABLE:

None.

LESSON AIDS

7—Emergency Control of Damaged Utilities

Collapse of structure may cause water, gas, and electricity hazards to trapped persons and rescuers. Rescuers should know what dangers to expect and the measures to take to minimize the dangers.

Water from damaged pipes may cause flooding of basements and unless quickly checked, may endanger persons trapped there. Rescuers should know where shutoff valves are usually located in dwellings.

Gas escaping from damaged lines may also be a hazard. Because its presence cannot always be detected by odor, valves on lines leading to damaged buildings should be shut off. Rescuers should know the general pattern of gas mains and locations of valves.

Rescuers should avoid direct contact with any part of a damaged building's electrical system until they are certain the power has been cut off.

Every electrical installation is controlled by at least one main switch. When electricity is used for power as well as lighting, there may be 2 main switches, 1 for each supply. Rescuers will have no trouble recognizing switch boxes and pulling switches. As an added precaution, rescuers may remove the fuses, but should not leave them where they can be replaced in the sockets.

If time permits, the instructor may wish to mention gas detectors. The sense of smell is not reliable as a warning against utility gas, particularly that containing carbon monoxide, but a special indicator can be used to detect carbon monoxide. Explosimeters may be used to detect explosive mixtures of gases. A flame safety lamp is a device used for determining oxygen deficiency in the air.

The following time schedule for topics in this lesson plan is suggested:

Refrigerants.....	15 minutes
Heating systems.....	15 minutes
Gas.....	10 minutes
Water and sewers.....	10 minutes
Electric hazards.....	10 minutes

LESSON PLAN NO. 7

COURSE: Light Duty Rescue—Course No. 14.2

LESSON TITLE: Emergency Control of Damaged Utilities

TIME: 1 hour

TRAINING MATERIALS:

Blackboard, chalk, eraser.

REFERENCE:

Rescue Techniques and Operations, FCDA, TM-14-1.

MOTIVATION:

One or all of the hazards outlined below may be present in a building in which rescue operations are carried on. Rescuers must be able to recognize these hazards and know what to do about them.

MAIN TOPICS	TEACHING POINTS
A. REFRIGERANTS	<ol style="list-style-type: none"> 1. Where encountered. <ol style="list-style-type: none"> a. In most residences, perishable food establishments, and transportation terminals. b. Common refrigerants. <ol style="list-style-type: none"> (1) Sulphur dioxide. <ol style="list-style-type: none"> (a) Used in old refrigerators and soda fountains and walk-in coolers. (b) Odor of rotten eggs. (c) Toxic. (2) Ammonia. <ol style="list-style-type: none"> (a) Used in ice cream and storage plants and air conditioning units. (b) Strong odor. (c) Suffocant, irritant, explosive (if heated). (3) Methyl chloride. <ol style="list-style-type: none"> (a) Used in grocery stores, beverage coolers, and perishable meat and food cases. (b) Sweet odor like chloroform. (c) Toxic, explosive, suffocant. (4) Freons (dichlorodifluoromethane). <ol style="list-style-type: none"> (a) Used in all types of refrigeration and air conditioning. (b) Sweet odor. (c) May be toxic. 2. Hazards. <ol style="list-style-type: none"> a. Explosion caused by ignition of concentrations of refrigerants. Tendency of refrigerants to pocket in confined places. b. Breathing. <ol style="list-style-type: none"> (1) Toxic—especially sulphur dioxide and methyl chloride. (2) Suffocants. c. Freezing—in liquid state will freeze flesh almost instantly. d. Extreme irritation. <p>May produce temporary blindness.</p>

MAIN TOPICS	TEACHING POINTS
A. REFRIGERANTS— Continued	<ol style="list-style-type: none"> 3. Precaution. <ol style="list-style-type: none"> a. Avoid igniting pockets of refrigerants. b. Avoid touching ruptured refrigeration systems with bare hands. 4. Shutoffs. <ol style="list-style-type: none"> a. Generally impossible to make remote shutoffs. b. Shutoffs are difficult to locate. c. Emergency shutoffs are possible by flattening out or pinching copper tubing.
B. HEATING SYSTEMS	<ol style="list-style-type: none"> 1. Categories. <ol style="list-style-type: none"> a. Residential. b. Commercial and industrial. c. Institutional. 2. Types. <ol style="list-style-type: none"> a. Directly fired installations—have no major distribution systems; rely on radiation and convection current for distribution of heat. b. Indirectly fired installations—have distribution system. <ol style="list-style-type: none"> (1) Heat distributed in form of: <ol style="list-style-type: none"> (a) Hot air through ducts. (b) Steam through pipes. (c) Hot water through pipes. (2) Distribution may be forced by: <ol style="list-style-type: none"> (a) Gravity—hot air or hot water. (b) Fan—hot air. (c) Pump—hot water. (3) Fed by coal stoker, oil, or gas. 3. Hazards. <ol style="list-style-type: none"> a. Burns. b. Scalding. c. Breathing. d. Explosion and fire. 4. Precautions. <ol style="list-style-type: none"> a. Avoid using tools made of steel or iron to flatten fuel lines (danger of sparks). b. Cut off flow of fuel if installation is liquid or gas fed. c. Instructor should encourage trainees to suggest other precautions. 5. Shutoffs. <ol style="list-style-type: none"> a. Indirectly fired installations (coal or wood). <ol style="list-style-type: none"> (1) Dump fire to ash pit and flood with water. (2) Stop fuel supply. b. Indirectly fired installations. <ol style="list-style-type: none"> (1) Stoker fired systems—cut off power. (2) Oil fired systems—cut off power and fuel supply. (3) Gas fired systems—close shutoff cock. If fuel line is ruptured, flatten or plug.

MAIN TOPICS	TEACHING POINTS
C. GAS.	<ol style="list-style-type: none"> 1. Utility gases are found in nearly every residential, commercial, and industrial establishment. 2. Used for cooking and heating. 3. Used industrially for refrigeration and, in specialized form, for specific product manufacturing. 4. Hazards. <ol style="list-style-type: none"> a. Breathing problem. <ol style="list-style-type: none"> (1) Oxygen deficiency where other gas has displaced oxygen to a point where atmosphere will not support life. (2) Toxic gas. (3) Irritant gas. b. Paralysis. c. Explosions. <ol style="list-style-type: none"> (1) Some gases explode if proper combination of combustible material, oxygen, and ignition takes place. <ol style="list-style-type: none"> (a) Ignition may come from anything that produces a spark—even shoe nails striking metal or stone, or snapping electric switch. 5. Precautions. <ol style="list-style-type: none"> a. Ventilate area if possible. b. Refrain from smoking. c. Refrain from using naked lights or metal tools. d. Allow burning gas mains to burn unless causing additional fires. e. Use gas masks, if available, according to directions. 6. Shutoffs. <ol style="list-style-type: none"> a. Communities have diversified systems of distribution and equipment. <ol style="list-style-type: none"> (1) Rescuers should know the system in their community. (2) Rescuers should find out what system is used in strange areas. b. Major shutoffs must be made by utility company. Shutoffs at gas source do not eliminate danger from gas remaining in local mains. c. Immediate gas shutoffs may be made at meter cock, usually in basement, or curb cock at street. <ol style="list-style-type: none"> (1) Turn clockwise. (2) Pinch soft pipe. (3) Avoid sparks.
D. WATER	<p>Ruptured water mains may cause flooding.</p> <ol style="list-style-type: none"> a. Trapped casualties in low areas may drown. b. Utility company should valve off water mains. c. House occupant or rescuer should cut off water at house. d. Water should be removed from low areas with pump provided by engineering or fire services.
E. SEWERS	<ol style="list-style-type: none"> 1. Generally gravity flow. 2. Obstacles caused by ruptured sewers. <ol style="list-style-type: none"> a. Gases—toxic or explosive. b. Bad odors. c. Flooding. 3. Sewerage shutoffs. <ol style="list-style-type: none"> a. Generally no valves for shutoffs. b. Temporary plugs stop flow.

MAIN TOPICS	TEACHING POINTS
F. ELECTRIC	<ol style="list-style-type: none"> 1. Hazards. <ol style="list-style-type: none"> a. Wires and cables trailing from poles or hanging slack. b. Metal structures in contact with wires. c. Puddles on ground with wires passing through them. 2. Precautions. <ol style="list-style-type: none"> a. To break contact of victim with live wire, use dry lumber or any other article that is a nonconductor of electricity. b. High voltage wires should not be handled by rescuers untrained in that field. c. Although power may be off, it may come on unexpectedly. d. Use back of the hand as a feeler if moving in the dark. If it hits a "hot" wire, it will be thrown clear instead of "freezing" on the wire as it would do if the finger and palm of the hand were used.

STUDENT PARTICIPATION:

Questions and answers.

HANDOUT MATERIALS AVAILABLE:

None.

LESSON AIDS

8—Casualty Simulation

Realism in rescue training makes the training more valuable. Rescue trainees will have a greater sense of accomplishment if the casualties they reach look like casualties. Instructors should provide persons willing to portray casualties.

The community can supply the casualties. Experience has shown there are usually far more volunteers than needed. A good source of casualty personnel is local theatrical groups. They can be helpful in makeup as well as acting.

The instructor must be familiar with the appearance, signs, and symptoms of the injury to be produced. A knowledge of first aid is important to casualty simulation.

Casualties should be told how to act, particularly how to react to good or bad handling by rescuers.

Old clothing, torn and bloodstained to suit the nature of the injuries, should be worn by casualties, and liberal use made of dust and dirt.

In States that do not provide compensation coverage by law, the instructor should discuss with the local civil defense director the problem of personal liability during training and exercise.

LESSON PLAN NO. 8

COURSE: Light Duty Rescue—Course No. 14.2

SUBJECT TITLE: Casualty Simulation

TIME: 1 hour

TRAINING MATERIALS:

Basic Makeup Kit for Casualty Simulation, p. 50.

REFERENCE:

None.

MOTIVATION:

Rescue training should be as realistic as possible. Persons made up to resemble casualties should be used in rescue exercises. All types of injuries which might be sustained by persons needing rescue should be simulated.

MAIN TOPICS	TEACHING POINTS
A. PURPOSE	To make rescue practice realistic by simulating injuries which might be sustained by trapped disaster victims.
B. REQUIREMENTS	<ol style="list-style-type: none">1. Demonstrator.—The demonstrator should:<ol style="list-style-type: none">a. Simulate the injury on a casualty as realistically as possible.b. Brief the casualty on signs and symptoms of the injury.c. Remove the materials used on the casualty when the demonstration is over.2. Casualty.—The casualty should learn to act the part.3. Materials.—Materials for casualty simulation are listed on page 50.
C. MAKEUP	<ol style="list-style-type: none">1. Wounds.—Wounds can be simulated by:<ol style="list-style-type: none">a. Modeling clay, restorative wax, or other similar substances moulded on casualties into the required shape and tinted the natural color of the skin. The edges should be smoothed with petroleum jelly or cold cream, a simulated cut made with a dull edged tool, then filled with imitation blood. Dust and dirt should be sprinkled on the wound.b. Cardboard, papier-mache, rubber, or sponge. These should be kept on hand and applied by tying or fixing to the casualty.2. Fractures.<ol style="list-style-type: none">a. Simple fractures: these can be represented by strapping a piece of bone to the point at which the limb is supposed to be fractured (adhesive tape will hold it in position). The necessary shape can then be moulded with restorative wax and the edges shaded to simulate bruising.b. Compound fractures: The method is similar to that for the simple fracture, but the bone should protrude through the moulded shape; imitation blood should be used for added realism.c. Complicated fractures: Because fractures may involve rib and lung injuries, simulation should include evidence of internal bleeding.

MAIN TOPICS	TEACHING POINTS
<p>C. MAKEUP—Con.</p>	<ol style="list-style-type: none"> 3. Faces.—Persons with the type of face most suited to portray the symptoms of an injury should be chosen as casualties. One whose face is normally pale makes a realistic shock case, while one whose normal color is high is better for an asphyxia case. <ol style="list-style-type: none"> a. Pallor: Pallor is produced by white liner, clown white, sallow grease paint, or gray grease paint, according to the degree required. Sallow is the most effective. White is effective at night but is too glaring for daytime use. Gray gives good results with simulated bleeding. Generally, if just enough makeup is applied to cover the casualty's natural color an excellent pallor effect is obtained. b. Flushed face: Rouge applied lightly and evenly is effective. c. Carbon monoxide poisoning: The effect is produced by a light, even application of pink grease paint. Rouge applied to the cheek bones gives heightened color. 4. Burns. <ol style="list-style-type: none"> a. To simulate first degree burns apply rouge lightly and evenly. b. For second degree burns apply cellophane or acetone-type cement to denote blistering. c. For third degree burns apply rouge and cover firmly with a thin pad of restorative wax as a mask. Cover the edges of the area with burnt cork mixed with a little petroleum jelly or cold cream to simulate charring. Remove restorative wax by lifting, leaving enough torn wax around the edges to simulate skin. Touch up burn with a little petroleum jelly or cold cream to give oozing appearance. (The clothing around the simulated burn should be charred to add realism.) 5. Crushing injury.—Gray grease paint should be applied over the area presumed to be affected, and the area well powdered. Place some heavy object on the casualty to simulate the means of crushing. 6. Internal bleeding. <ol style="list-style-type: none"> a. The face should be made up for pallor. Casualty's breathing should be sharp, and labored, and he should gasp for air. b. For further realism a capsule of catsup can be put in the casualty's mouth and broken at the appropriate moment. This will produce red, foamy saliva resembling bleeding from the lungs. Coffee grains mixed with imitation blood will simulate bleeding from the stomach through the mouth. 7. Shock.—The face should be made up for pallor. To simulate extreme shock, blue or dark gray shading should be put on the lips and the lobes of the ears. To represent cold sweat, beads of fluid glycerine should be sprayed on the forehead and upper lip. 8. Severed artery.—This can be simulated by a length of small diameter tubing attached to the skin with adhesive tape and thinly covered with modeling clay. A bulb containing imitation blood operated by the casualty simulates the spurting of the artery.

MAIN TOPICS	TEACHING POINTS
D. ACTING	<p>Greater realism is obtained if the casualty can act his part well. For example:</p> <ol style="list-style-type: none"> 1. Breathing.—As injured persons usually breathe through the mouth, mouth breathing should be practiced. 2. Shivering.—A natural reaction to injury is shivering. This can be practiced as follows: First, with the lower jaw and face muscles. To prolong the effect the intake of breath should be controlled through the mouth. If the muscles of the shoulder and upper arm are tensed, the lower arm can be made to shiver. A similar tensing of the muscles of the lower back area and thigh will cause shivering in the lower part of the leg. Each should be practiced separately, then the three combined until complete shivering motion of the face and limbs has been achieved. 3. Short, shallow breathing.—Only the upper part of the lungs should be used; when breathing out the sound "er" should be added in a low tone. 4. Heavy, stertorous breathing.—In addition to snoring, the cheeks should hollow in and puff out with each breath taken and expelled. 5. Speech.—Speech should be garbled, and may also be a husky, low whisper. 6. Muscular movement.—This should be slow and deliberate. Fast and jerky movements should be avoided. 7. Eyes.—The eyes can be used to good effect in portraying pain. A dull expression can be achieved by throwing the eyes out of focus.
E. POINTS TO REMEMBER	<ol style="list-style-type: none"> 1. Pain should be expressed by the eyes and a general tautness of muscles. 2. Attention should be paid to details of shock. 3. Affected parts should be powdered after grease paints have been applied. 4. Grease paint and makeup should not be used to excess. 5. Unconsciousness should not be carried on too long; the casualty should appear dazed on returning to consciousness. 6. For realism casualties should be covered with dirt and dust.
F. CONCLUSION	<ol style="list-style-type: none"> 1. Casualties with simulated injuries create realism and add casualty handling problems to rescue training. The following points must be considered in casualty simulation: <ol style="list-style-type: none"> a. Categories of rescue in which trainees are to be tested. b. Type of injury based on type of structure collapse. c. Casualty's part.—What he says and does.

STUDENT PARTICIPATION:

Trainees should work in teams of 2, 1 as casualty, the other to make him up. The instructor should determine types of wounds for each team and supervise their work.

HANDOUT MATERIALS AVAILABLE:

None.

Basic Makeup Kit for Casualty Simulation

Makeup.

Item	Color	Quantity	Use
Burnt cork		Small jar	To mix with petroleum jelly or cold cream for dirty or charred effect.
Clown white	White	1 3/4 oz.	Pallor.
Cold cream or petroleum jelly	White or clear	8 oz.	To blend restorative wax and makeup and to remove makeup. Petroleum jelly mixed hot with red grease paint for congealed blood.
Face powder	White	5 oz.	To cut greasy look of makeup.
Flexible collodion		1 oz.	To shape wounds. (Do not use on face or near eyes).
Glycerine	Clear	Pint	To imitate sweat.
Grease paint	Black	1 large stick	Dirt, charring, third degree burns.
Grease paint	Gray	1 tube	Shock, toning down skin.
Grease paint	Pink	1 tube	Toning skin according to casualty.
Grease paint	Red	1 tube	Mix with petroleum jelly for congealed blood.
Grease paint	Sallow	1 tube	Shock, toning skin according to casualty.
Liner	Black	1/2 oz.	Third degree burns, bruises, etc.
Liner	Blue gray	1/2 oz.	Shock, indications of crushing or pressure.
Liner	Lavender-purple	1/2 oz.	Bruises.
Liner	Light blue	1/2 oz.	Toned with red for bruises, black eyes, etc.
Liner	White	1/2 oz.	Pallor.
Modeling clay	As near flesh as possible		Alternative to restorative wax.
Restorative wax	Flesh		Base material for building up wounds and fractures.
Rouge	Carmine	1/2 oz.	For tinting restorative wax or modeling clay, first degree burns, flushed faces, carbon monoxide poisoning, etc.

Tools and Accessories.

Bones		Broken pieces	To simulate fractures.
Bulb syringe			To hold imitation blood for severed arteries.
Camel's hair makeup brushes, 1/4 and 1/2 in.			To apply makeup.
Cardboard, papier-mache, or 1/2-in. adhesive tape.			To make dummy limbs and wounds.
Catsup	Red		To fill mouth capsules.
Cellophane or acetone-type cement			To simulate blisters in second degree burns (do not use on face or near eyes).
Cornstarch or corn syrup	White or clear		To mix with water and red food coloring for imitation blood.
Dummy limbs or moulages			To simulate amputations.
Eye dropper		1	To fill mouth capsules.
Foam or sheet rubber			An alternative to cardboard.
Food coloring	Blue	2 oz.	To tone down redness of imitation blood.
Food coloring	Red	2 oz.	To mix with water and cornstarch or clear corn syrup for imitation blood.
Imitation blood, readymade	Red	1 pt. thick, 2 pts. thin	To simulate bleeding.
Liquid surgical adhesive or rubber base library paste.		1 tube	To fix wounds to body.
Mouth capsules			To hold catsup or imitation blood.
Oatmeal			To simulate debris and plaster.
Oil can (squirt type) pt. size		1 (thick blood) 1 (thin blood)	To apply imitation blood.
Old clothes			To save good clothes.
Plastic	Clear		To simulate glass in wounds.
Salt shaker		1	To spread dirt.
Spray		1	To spray glycerine.
Tongue depressor or orange stick		1	To shape wounds.
Tubing (small diameter)			To simulate arteries.

LESSON AIDS

9—Rescue Exercise

A rescue exercise should resemble as nearly as possible a real situation. The injuries should represent those that could be expected in such a situation. The collapses and debris should be real.

An appropriate facility is necessary for a rescue exercise. City officials may be able to make available buildings being torn down or dismantled. These often resemble war-damaged buildings.

The objective should not be a smooth and perfect show for the benefit of spectators. Rehearsals should be general in nature and not cover specific actions.

The exercise should include situations that test trainees in the skills and techniques learned during the course. Trick situations should not be put into the exercise. Because the exercise is designed to test rescue workers' ability to use initiative and common sense when faced with unexpected situations, they must not be given details of the exercise.

Before the exercise, however, the instructor should explain the following:

1. Objectives.
2. Lessons to be learned.
3. General nature of the exercise.

Persons to act as casualties should be obtained from outside the class. They should be made up and coached in what to say and how to act.

At the conclusion of the exercise, the chief instructor should hold a critique on the spot. He should be sincere, giving credit for good performance, and constructive criticism for less satisfactory performance.

LESSON PLAN NO. 9

COURSE: Light Duty Rescue—Course No. 14.2

LESSON TITLE: Rescue Exercise

TIME: 2 hours

TRAINING MATERIALS:

Will depend on the extent of the exercise.

REFERENCES:

All previous lessons and notes.

MAIN TOPICS	TEACHING POINTS
A. PURPOSE	1. To test efficiency of the trainees. 2. To test the trainees' civil defense knowledge.
B. SCOPE	Type of exercise will depend on: 1. Size of class. 2. Facilities available. 3. Instructor personnel available. 4. Time: day or night.
C. PREPARATION	1. Steps. a. Decide types of skills to be incorporated. b. Determine source of casualties—it is more satisfactory to rescue real people than dummies. c. Outline the sequence. d. Write the narrative. e. Select persons to act as casualties. f. Rehearse casualties. 2. Time schedule. a. Set time for each incident. b. Don't allow problem to drag. 3. Responsibilities. a. Role of umpire (instructor). b. Role of acting warden (instructor). c. Trainee responsibility. 4. Briefing.—Trainees should be thoroughly briefed.
D. EXERCISE	1. Signal. 2. Reporting to scene. 3. Sequence of incidents. 4. Conclusion of exercise.
E. CRITIQUE	Equally important to the exercise is a thorough critique of squad members' action. A statement in general terms that the exercise was excellent, good, fair, or poor is not sufficient. The chief instructor should conduct his critique in the following order: 1. Squad leaders' comments.—They should avoid the defensive attitude. 2. Team members' comments.

MAIN TOPICS	TEACHING POINTS
E. CRITIQUE—Con.	3. Warden's remarks. 4. Umpire's report. 5. Chief instructor's report.—Should be a summary of the exercise.
F. EVALUATION	Did the exercise accomplish its purpose?

STUDENT PARTICIPATION:

Trainees should be assigned parts in the exercise to put into practice the knowledge, skills, and techniques they have learned during the course.

HANDOUT MATERIALS AVAILABLE:

None.

REFERENCES

Selected FCDA Publications

These publications can be obtained from local civil defense organizations or purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at nominal cost.

Basic Rescue Course, IG-14-1, 1956.

Civil Defense Instructor's Course, IG-3-3, 1956.

Construction and Adaptation of Structures for Rescue Training, TB-14-1, Dec. 1952.

Federal Contributions Manual (including Changes 1 through 12), M25-1 (Revised).

Introduction to Radioactive Fallout, IG-19-1, 1955.

Rescue Techniques and Operations, TM-14-1, 1953.

The Rescue Service, AG-14-1, 1951.

Other Publications

All Government publications can be purchased from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., at nominal cost.

Water vs. Fire, Forest Service, U. S. Department of Agriculture, 1950.

New Method of Artificial Respiration, Bureau of Mines, United States Department of the Interior, 1952.

American Red Cross First Aid Textbook and Supplement No. 1, The Blakiston Co., Philadelphia, Pa.

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